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by

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# SUMMARY*

*Providing universal access to drinking water remains a formidable challenge in the cities of developing countries and all potential technical and institutional solutions need to be taken into account. By looking at the specific example of "user group networks" set up in a poor neighbourhood in the North-East of Mumbai, this article aims to highlight the ability of local communities to design and run functional systems that compensate for shortcomings in the public service. We will analyse the effective role that users play in regulating these groups at local level as well as the political-territorial implications of this type of management. After providing a clear overview of the systems that have emerged and their modus operandi, we will describe and assess them from a critical technical/economic perspective in order to suggest possible improvements.*

*More generally, our research is part of a broader attempt to study the different ways of providing access to urban water and the legitimacy of local communities in taking the process in hand. We wish to contribute to the debate that focuses on providing a differentiated service to the inhabitants of the same city.*

**Keywords:** Mumbai, water service, user group, slum, alternative.

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## Introduction

Providing universal access to drinking water remains a formidable challenge in the cities of developing countries where an estimated 500 million people still do not have a proper service (USAID/PADCO 2001). Inhabitants are forced to group together to overcome a deficient or totally absent public service, sometimes simply to ensure their survival. In India, where there is still a strong statist culture in the management of potable water systems, the government actually denies that alternative networks exist, preferring to consider such systems as stop-gap solutions where the universal public service system cannot keep up with rapid expansion. However, in 2001, 26 per cent of the urban population was still not connected to the public drinking water network (World Bank 2006) and in certain neighbourhoods, alternative arrangements were beginning to acquire a *de facto* air of permanence. Given that the conventional network paradigm is coming under strain from a diverse range of alternative solutions, it would therefore appear well worthwhile to focus on these arrangements within the perspective of universal service.

This article will use a detailed analysis of such practices in a poor neighbourhood of Mumbai to contribute to the debate over alternatives to conventional public service networks. Research into this type of solution was first initiated by the World Bank in Nigeria (Lee and Anas 1989) before being extended to other Southern countries. It has highlighted user reliance on private offerings to replace, or round out the public system offering (Sethi 1992; Humplick et al. 1992; Vaidya 1994; Choe et al. 1996). Once the deployment of these types of "compensation strategies" was highlighted (Zérah 2000), a number of studies focused more specifically on the role of small private operators in catering to the needs of populations that have not been connected to the public service (Collignon and Vézina 2000; Llorente and Zérah 2006). They show how the different solutions available to such households (privately-drilled wells, resale of water, mini-networks, etc.) have been effectively tailored to the local context in which they have developed and how at least some look as if they will survive into the future. And even if they are not as effective, these systems are frequently cheaper and much more flexible than a public service based on the principle of full cost recovery. These research findings partly explain the failure of the privatisation reforms of the 1990s based around the supposed "willingness to pay" of low-income users and in particular, they challenge the temporary nature of some of these stop-gap systems.

In Indian cities, these types of practices have been observed among populations connected to networks (Zérah 2000; Dutta 2005), in newly-urbanised middle- and upper-middle class areas (Maria 2008), in informal neighbourhoods (Raghupati 2003; Conan 2004) and in slum areas where there is no legal title to land (Tovey 2002). To complete the picture, we felt it necessary to analyse the specific case of a recently-authorised slum area[1] where alternative arrangements are in the process of becoming permanent.

This article will focus on mini networks, described as *user group networks.* These are unusual insofar as they have been set up and run by the inhabitants in spite of the fact that their neighbourhood now has official legal status. At a first glance, they are quite similar to the *gali taps* highlighted by Tovey (2002) or the spaghetti pipe type informal networks identified by Raghutpati (2003) in Delhi, however they are different in terms of their specific local geographic and land ownership features. What are the specific characteristics of these user group networks? Can they now be considered as sustainable solutions and if so, what stance have the authorities taken in this regard? Building on other research into the links between network-based services and urban spaces (Graham, Marvin 2001; Jaglin 2005), this analysis will attempt to show how these "user group networks" reflect specific territorialisation strategies. And on a broader level, we will analyse the whole issue of perpetuating the local water supply systems set up by poor communities.

This study[2] presents the findings of field research conducted in 2007 in a poor neighbourhood of Mumbai that is badly served by the municipal network. Since the area is located at an altitude, water pressure in the "conventional" system managed by the City Council is insufficient to serve all dwellings, so residents have designed about fifteen technical solutions comprising a motorised pump and a network of narrow water pipes. The creation and autonomous management of these user group networks is an opportunity for those communities involved in developing specific sets of operating rules and standards outside the conventional public system.

1 In India, there are two types of slum: squatter settlements comprise self-built, generally unauthorised settlements while slum areas consist of older, insalubrious slum dwellings that now have authorised legal status (see Dupont and Ramanathan 2007).

2 A four-months research was necessary in 2007 in order to circumscribe the specific features of the research subject. 93 users and all of the slum area community leaders were interviewed.

# 1 An authorised slum not connected to the public drinking water network

## *1.1 A marginalised neighbourhood from a spatial and economic perspective*

The research was conducted in a poor, peripheral neighbourhood of Mumbai in the western extremity of Ward[3] S[4] in Constituency 216, or more specifically between the wall of Sanjay Gandhi National Park[5] and the gravity-fed water mains system that feeds Mumbai's reservoirs[6] (see Maps No.1 and No.2). The administrative situation of this slum was regularised in 1997 and it is now called Ram Nagar. It has a population of around 20,000.

The neighbourhood is bound by the primary water mains to the east and by the Park to the west (see Map 3 and the illustration). It comprises successive dwellings built along a gradient between 50m and 110m. This system of settlements based around different levels reflects the area's social geography. Living conditions deteriorate the higher up one lives and they reach their nadir at the top where the worst-off live[7]. Most of the inhabitants work but the salaries of those interviewed are very low and vary between 1,500 rupees (27€) and about 10,000 rupees (185€) per month. The median monthly salary is about 3,000 rupees (55€). The majority are able to read and write and many speak two languages (Marathi and Hindi), however virtually nobody can speak English.

Given its location (at the periphery of S-ward) and its socio-economic profile (very poor population), the *BMC*[8] has little real presence in the neighbourhood which continues to be regarded as a slum in spite of the fact that it now has authorised status. Its role is limited to officially carrying out the work that the local population has requested through its local

3 The local government system was overhauled in 1964 with the creation of "wards" (districts) as a first step towards decentralisation and in order to speed up administrative procedures and make them more effective. Mumbai was divided into 24 wards, each of which was split into Zones corresponding to electoral constituencies.

4 S-Ward is relatively poor compared to Mumbai's other wards. There is no real industry and only limited economic activity. The 2001 census identified a total population of 691,227, of which 85.83% live in slums (the average for Mumbai as a whole is 54.08% with a total population of 6.475 million).

5 Sanjay Gandhi National Park, which straddles the research area, is the world's largest urban park with an area of 104km² and the most visited park in Asia. It was created in 1961 and is now surrounded by a wall designed to protect it from urbanisation.

6 Since 1954, a section of Mumbai's primary water supply network traverses the West of the Ward. This gravity-fed system comprises four principal mains that carry on into the South of Mumbai. They feed a whole network of storage reservoirs which in turn feed a secondary distribution network. Normally, nobody is allowed to live along this pipeline for maintenance reasons, however, in reality, there are dwellings along almost its entire length and this is also the case in S Ward.

7 The *Adivasi* (indigenous population), *Dalits* and migrant workers are forced to live on the top of the mountain. They comprise an estimated 600 people living in extremely difficult economic circumstances.

8 "BMC" is the acronym of Mumbai city council, i.e., *Brihanmumbai Municipal Corporation*.

representatives. The Corporator of Constituency 216 and the Legislative Assembly Member (MLA) for S-Ward are the two key actors in Ram Nagar's development. They belong to the two main political parties operating in Ram Nagar, i.e., the Corporator is a member of Shiv Sena[9] while the MLA member belongs to the National Congress Party[10] (NCP).

### *1.2 Origins of this user group networks: A response to the failure of the public drinking water system*

Until 1997, the BMC refused to supply Ram Nagar with water due to its unauthorised status[11] and the inhabitants had to get their drinking water illegally from the City's main water supply. In order to limit the damage to the water supply system, the municipality installed a small number of taps directly onto the water mains in the early 1980s before adding a lot more in the early 1990s[12]. Once their settlement had been authorised, in order to be officially connected to the water supply network, users banded together in "user groups" of about ten users based on their physical proximity and in line with established practice in Mumbai[13].

Water pressure from the public reservoir serving S-Ward is sufficient to pump water to locations not exceeding an altitude of 50 meters. The dwellings in Ram Nagar which are technically excluded from any extension to the conventional supply network are directly hooked up to the primary water mains that feed the reservoir for S-ward (see Map No. 4 and diagram No.1). Dwellings located downhill to the east of the mains pipe get a good service but those lying uphill to the west have very poor water pressure. Since the City's drinking water system is intermittent and gravity-fed, the water pressure inside the primary water mains varies considerably depending on the flow rate at any given time. Water cannot generally reach taps at an altitude of over 55 meters. Faced with the technical shortcomings

9 Shiv Sena is the Maharastra regional Hindu nationalist party with roughly the same ideology as the better-known Bharatiya Janata Party (BJP), "the party of the Indian people". It opposes the NCP which broke away from the Indian National Congress (Congress Party).

10 Created on 25 May 1999 following a rift with the Indian National Congress (INC) party. The INC was founded in 1885 and is the oldest political party in India. It spearheaded the nationalist drive for independence. This rift concerned the Italian origins of INC's Chairperson, Sonia Gandhi.

11 In 1997, the City voted to regularise the status of all slums that had existed before 1995.

12 Indeed, as J. Ruet noted, we may wonder about the "schizophrenic" attitude of the authorities who began providing a service while simultaneously denying the existence of these users (Ruet 2002).

13 A user group generally comprises between five to fifteen households that share the same connection (comprising a water meter and tap). The quarterly bill is then split on an equal basis between the different members of this group connection. This system of charging for water sets Mumbai apart from other Indian cities where water policy is based around installing standpipes in slums, generally free of charge.

of the public drinking water system, marginalised user groups have developed a *modus operandi* tailored to their neighbourhood's physical constraints.

This alternative consists of local networks supplied by a group connection to the BMC's primary water mains and hooked up to a powerful electric pump (see diagram No.2).

Because of its technical configuration, the water service only works when the pump is on and is limited – and rendered intermittent - by the electricity required to keep the pump running. The system's operation and maintenance requires the presence of an employee tasked with getting the pump started and monitoring both the reservoir and the valve openings. This person is paid between 1,000 and 3,500 rupees a month (between 18€ and 54€) depending on the size of the network.

This type of system can serve several groups of dwellings of very different sizes – from 40 to over 800 households – and is therefore much larger than a normal user group which is officially limited to 15 households under the aforementioned definition. There are a total of 15 such networks (see Map No.5) supplying drinking water throughout the slum to 4,500 households or about 20,000 people in all (see diagram 1). In addition to the differing sizes of the fifteen networks, we also note the existence of several superimposed networks, indicating overlapping services within the same territory.

These user group networks[14] represent a major step forward for the inhabitants of a neglected area who have developed an alternative technical solution that has greatly improved their access to water.

We will use two perspectives to analyse these systems: *the approach used to create and manage them* (2) and *their modus operandi and performance* (3).

14 By drawing upon existing "user group" jargon, we seek to associate this research with previous analyses and the terms "groups", "arrangements", "solutions" and "systems" will all refer back to the general term of "user group networks".

## 2 Locally based systems involving a wide range of actors

### *2.1 Involvement of a number of actors*

The timeline tracing the emergence of these user group networks points to the major role played by the Indian NGO, "Casp Plan"[15] which managed to break the administrative log jam by getting community, municipal and political decision-makers around the same table. It played a key role in getting the slum's first three networks up and running.

The first phase involved mobilising the communities. Setting up and registering a large number of user groups (there were initially between 250 and 300 of these) appears to be a *sine qua non* for reaching a compromise with the municipality as it provides a legal framework for the whole process, legitimises demands and harnesses considerable financial potential. The second stage involved devising a low-cost technical solution. The compromise agreed upon was as follows. The municipality limited its commitment to installing a reduced infrastructure (based around a group connection and overground narrow diameter pipes powered by a motorised pump); however, the entire cost of this infrastructure plus installation, management and maintenance costs had to be picked up by the user group. The final stage consisted of drawing up a business plan. 75 per cent of the cost of the first three projects was paid for by the NGO. The total cost was somewhere between 1 and 1.5 million rupees (or 18,500 €), so this assistance amounted to 700,000 rupees. The remaining 25 per cent was paid for by the inhabitants themselves. The initial contribution per head amounted to between 500 rupees and 1,500 rupees (between 9€ and 30€). The municipality did not participate in financing the project.

After the NGO was wound down, the inhabitants turned to political financial backers for the additional funds needed to develop the infrastructure. The local situation is conducive to this type of arrangement as, although slum populations do not have much in the form of economic capital, they do have a certain amount of political capital that they know how to leverage in line with electoral opportunities. Conversely, elected

15 Community Aid and Sponsorship Program (CASP) was an Indian non-governmental organisation that was created in 1976 and wound down in late 2000. Most of its programmes focused on child education and living conditions and it had a presence all over India: http://www.caspindia.org/

representatives have considerable local financial clout[16] and they need local votes to stay in office. Consequently, some user groups clearly appear to have political leanings and these are especially marked in systems sponsored by Shiv Sena. The party recruits "social workers" who provide an important link between the slum populations and their elected representatives and help to spread the party's message. The funding of the largest network (840 members) by the *Sri Chhatrapati Rahivasi Sangh* community involved mobilising political support from local all the way up to national level with the backing of the BJP[17] and helped raise 700,000 rupees. Once its efforts had borne fruit, Shiv Sena secured a physical presence in the neighbourhood's central space by building a *Shaka*[18] which has become the administrative centre for those dwellings covered by the network. Other structures skilfully raised funding for purely utilitarian ends without any regard to the political creed of the donor nor to any particular sense of political allegiance. For example, the *Chnatrapathi Shivaji Mavrata Utsaw Mandal* user group offered its political support to the MLA (affiliated to the NCP) after being turned away by the Corporator[19]. So, political representatives play a far from neutral role in the acquisition of network infrastructures. However, because of the inevitable political payback in terms of votes and party allegiance, many groups prefer the neutrality of independent financial backing even if this increases the contribution of each member (spread over time).

The emergence of projects is closely related to those who back them and the underlying community entrepreneurial or market logic:

- Some arrangements may be driven by a purely market approach and result more from an individual initiative than any collective aspirations. An enterprising inhabitant may decide to set up a network, raise the initial investment via a private loan and bring other inhabitants in, primarily for the purpose of reaching an optimal number of users. In this type of project, the private entrepreneur considers the other inhabitants simply as "consumers" and they see themselves more as "customers" than actually as members. These

16 In the form of special funds allocated based on the development needs of their constituency (in 2007, these amounted to 4,700 euros for the Corporator of the constituency studied and 150,000 € for the MLA for S-Ward).

17 The BJP (Bharatiya Janata Party), or "Party of the Indian People" is a Hindu nationalist party founded in 1980.

18 The ''Shaka" is a building draped in Shiv Sena's colours where the "social workers" meet.

19 The Corporator claimed that "*Chnatrapati Shivaji Mavrata Ustaw Mandal*" (which was finally set up in 2005) was not a priority project as all of its network members were already being served by neighbouring networks.

entrepreneurs are also motivated by a desire for recognition and power (indeed, each has had his neighbourhood named after him). For example, the project set up by Appa Balgue (founder of *Shriram Sanjeevan Pani Prakalp water project* in 2003) can be traced back to a conflict between the founder and other project leaders as well as the wish to free users from dependence on the existing service providers. By coming up with an innovative offering (individual taps), he was able to bring in 200 members. Consequently, this new competition-based service allowed some users who were already connected to an existing network to either accumulate two service provider offerings from two competing networks or to get rid of their initial supplier[20].

- Other projects may be backed by an enterprising individual who volunteers to set up and run a network for the inhabitants of the neighbourhood. Their primary motivation is to boost their social status within the group. In this type of project, responsibility is shared by all of the group's members and all contribute equally to the initial project financing. Users see themselves as stakeholders. They are “members” and implicitly consider themselves to be the owners as well, so they fully intend to have a say in how the network is run.

- Lastly, there is a category of projects that lies somewhere in between those driven by purely market logic and those based around a more cooperative mindset. Some networks appear to strengthen or create previously non-existent community links whereas other systems which were apparently community-based, quickly develop into purely market-driven systems.

### *2.2 Different forms of network management*

The different approaches and mindsets that underpin the projects at the outset result in markedly different ways of running the networks and various degrees of user involvement in the network management committee (comprising a chairman, secretary and treasurer) depending on the user group size. We may distinguish four types of management: “consent- and community-based”; “delegated and democratic”; “private” and “confiscated”.

- Some groups tend to be dominated by a charismatic founder who is deemed the most suitable person to run the network (albeit within a formal committee) because of his/her competencies and who has frequently gained the trust and confidence of the

20 This system is a lovely example of a flaw in the so-called theory of natural monopoly supposed to exist in the management of network-based services.

inhabitants. The founder is reappointed or the term of office is extended by means of "negative" participation insofar as the implicit approval of the members is expressed through the absence of any demands. This type of group functions by means of "neighbourhood participation" where users are able to convey any complaints to the leader through direct everyday contact. It is found especially in small groups where there are strong ties based around familiarity and trust and where the limited number of members facilitates consensus-building that would be difficult to achieve in structures of a larger size, e.g., concerning water distribution times. It, therefore, appears legitimate to characterise such groups as "community-based".

- Larger groups are administered by a complex management committee comprising elected micro-local leaders who each represent a group of dwellings. Although such groups may not actually be as "democratic" as they claim[21], we should still recognise that this type of committee is generally fairly representative of the population that it serves. Each committee member uses formal monthly meetings to voice the demands of their immediate entourage at community network level and informs local users of the decisions that have been taken by the committee. The functions of this committee go way beyond running the water service. They also look after workaday community matters, ranging from disputes between neighbours to street lighting, the evacuation of rainwater and managing budgets. It holds an extraordinary general meeting once or twice a year where it reports back to the population on its activities for the period.

- The committees of user groups run by a private entrepreneur largely resemble the management committees of private companies, comprising non-elected individuals that have played a key role in financing the network. The managers derive their legitimacy both from their financial stake in the network and their familiarity with the system. In such "private" networks, user involvement in running the network is virtually non-existent because there are no face-to-face meetings that would enable users to interact with the operator. And while private management is not necessarily resented provided users get a good service, if they feel they are getting a poor service there are few ways of changing things, barring direct confrontation between the "customer" and the private entrepreneur. However, as competing water services move into Ram Nagar (sometimes competing for the

21 On account of the informal nature of the election process, these leaders often seem to have been handpicked instead of actually elected.

same user areas), these interactions will probably lead to improvements as "customers" will have a wider choice of service provider.

- Other networks are characterised by their refusal to involve users due to internecine struggles for the right to manage the network. Utkar Rhahivasi Vikas Mandal, founded in 1994 by Damodar Gaekward, is a perfect example. In 2004, the management committee fell victim to Shiv Sena nationalists who embezzled large sums of money. Once he had taken successful legal action in 2006, Damodar Gaekward confiscated the reins of management. He intends to use the fact that he has sole legitimate power to manage the service honestly, drawing upon his supposed skill and experience and political independence, although the latter claim is questionable as he has the backing of the MLA–NCP. Users no longer have any real means of making themselves heard, yet this user group registers one of the highest rates of customer dissatisfaction concerning water distribution times.

### *2.3 Withdrawal of the municipal authorities*

Faced with the technical difficulties of expanding the conventional service using existing infrastructure, the municipality implicitly encourages these initiatives. It views them as a cheap means of serving all of the populations of these poor enclaves without having to become involved in actually running them.

So, while administrative requirements in India are normally complex and bureaucratic, requests for group connections are paradoxically straightforward and this has made it easier to get projects off the ground. Although these requirements have not been officially listed, they usually include the following:

- putting together a “user group”;

- providing proof of resident authorisation status[22];

- a *declaration of responsibility* issued by the founder;

- prohibition of pumping water directly from the primary water mains with the obligation of placing a reservoir near the primary system;

- property deeds for the land on which the pump and reservoir are to be located; and

- cost estimates as well as the installation of the network obligatorily performed by an engineer accredited by the municipality and paid for by the community.

22 By producing a ration card, voter card or other ID.

However, compliance with these procedures is fairly random. Certain entrepreneurs are operating freely even though they are completely non-compliant and this pervading laxity actually acts as an incentive in the creation of informal systems.

In spite of the large number of households connected, this type of system is still considered as simply a "user group" from a legal perspective. The municipality is only responsible for getting the water as far as the group connection. After that, sharing out and using the water is the responsibility of the inhabitants of Ram Nagar who are free to finance a "user group network" without any municipal participation. In other words, the municipality does not give any guarantee concerning reasonable access based on clearly defined quantitative (minimum duration of service), qualitative (health and sanitation) or economic (maximum individual charges) standards.

Since the *de facto* concession operator, i.e., the community or entrepreneur, is ultimately responsible for paying for the service, getting connected to the municipal system[23], setting up and expanding the network and the day-to-day technical and financial management for an indefinite period, this institutional arrangement is proof of the withdrawal of the municipal authorities even though there is absolutely nothing in writing to this effect.

### *2.4 Who puts up the money? (see Table 1)*

Analysis of the total cost of the different projects points to a number of findings. First, the inhabitants themselves contributed most (see diagram No.2). The total funding required for the fifteen networks amounted to 15.3 million rupees (283,300€). Users put up 60 per cent, private entrepreneurs 10 per cent and NGOs 11 per cent. Political representatives stumped up a non-negligible 19 per cent of total financing. Conversely, BMC did not put up a penny and even had to be paid for installing infrastructure.

The financing profile varies considerably from one project to another. Some are relatively heavily-funded by political actors while others may be paid for almost entirely by the users themselves. Self-financing is especially common for small projects[24] where the

23 Billed by the municipality between 85,000 and 100,000 rupees (1,500 to 1,850 €), depending on the exact situation.

24 But there are exceptions. The cost of the Sri Prasad Rahivasi Vikas Mandal project which was almost entirely user-funded, has exceeded 1,000,000 rupees since January 2010 due to the gradual installation of individual taps. This is also generally the case for projects funded by private entrepreneurs.

total cost is less than 500,000 rupees. Costly projects concern large-capacity systems and require at least one or several forms of external financing. So user contributions vary widely between projects (from 500 to 7,000 rupees per head) depending on what and how much backing has been secured. Projects with external backers require less user participation while self-financed projects involve higher per-head inhabitant contributions (sometimes spread over several years).

There are major disparities in both total project costs and contributions raised due to a number of factors. Size, and especially the length of water pipes and the capacity of the motorised pump and reservoir, is a crucial determinant in actual infrastructure cost. The presence of an external financial backer also pushes up total cost which would appear to suggest the payment of bribes or kickbacks between various intermediaries. Finally, a comparison of total costs declared with "total contributions raised"[25] sometimes highlights a significant surplus. Depending on the system in question, this surplus may be used to set up a reserve fund, improve the infrastructure, repay a loan put up by private entrepreneurs or to help fund the activities of a similar kind of association.

### *2.5 A network-based process of territorialisation*

The methods used to set up and fund the networks highlight the approachs and power relations specific to Ram Nagar. Their physical extremities mark out spatial boundaries between neighbourhoods in which different approaches prevail and each user group network supplies its own territory. In one sense, "the network management and regulation processes are factors in territorialisation" (Jaglin 2005: 16). Here we take the "territorialisation process" to mean "the attempt by an individual or group to affect, influence or control people, phenomena or relationships by delimiting and asserting control over a geographical area" (Sack 1986: 19). Each user group has developed a method of "controlling" a "geographical area" within the slum. This results in micro-local, geo-political power struggles or "rivalries between different social and political forces that strive […] to increase their influence over the populations living in territories of various sizes, that is, regions, urban agglomerations, cities or neighbourhoods" (Lacoste 2002: 146).

25 "Total contributions raised" comprise all of the sums raised regardless of where they come from. This corresponds to the total actual cost.

The geographical dimension of the service helps shape "political-ideological territories" that are more or less marked depending on the group and which may be mapped (see Map No.6).

A "micro" geo-political analysis of the networks points to these competing approaches and power relations. The *Chnatrapati Shivaji Mavrata Ustaw Mandal* network (No.15 on the Map) founded by Narkar in 2005 highlights an attempt at re-territorialisation by the MLA (NCP) via the water service. Users were already receiving a service (from networks No.9, No.4, No.12, or No.11 – see Map); however, the area was controlled by Shiv Sena (the Corporator had funded the bulk of the infrastructures), so the MLA (affiliated to the NCP) deemed it expedient to put up 80 per cent of the cost of financing this unneeded back-up network.

The example of the *Utkarsk Rahivasi Vikas Mandal* network (No.4), where its founder Damodar Gaekward was forced to use discretionary powers, is comparable in some ways to declaring a "state of emergency" to deal with the equivalent of an attempted neighbourhood "*coup d'état*" by Shiv Sena. Since he had fallen out with the Corporator (affiliated to Shiv Sena), Damodar Gaekward began dealing only with the MLA (NCP). Nevertheless, these political allegiances need to be put in perspective. Although there is a very strong correlation between the financing method used and politicisation of the neighbourhood in question, this relationship is by no means systematic. *Tanaji Vadi Seva Mandal* (No.2), *Krishna Seva Mandal* (No.8) or even *Shramik Vikassi Vibhag Mandal* (No.1) are relatively free from political influence and any politicisation is based around circumstances and opportunities. It is virtually absent from user groups founded by private entrepreneurs (Nos. 3 and 14) where the basis of the service remains a commercial one. Just as in more communitarian and non-politicised groups, any political allegiances remain in the private sphere. The map clearly shows that a majority of Ram Nagar users claim allegiance to Shiv Sena. In territories that lean more to the Congress Party, these claims are generally less categorical.

Finally, we may observe territorialisation creeping into commercial networks such as the *Shriram Sanjeevam Pani Prakalp* Project (No.14) founded by Appa Balgue. This private entrepreneur has used different approaches but a similar territorialisation strategy to extend his network to include new customers that were previously served by other networks.

Running a water distribution service based on a strategy of boosting market share is an excellent example of a flaw in the supposed theory of the natural monopoly of a network in a given space. In Ram Nagar, streets supplied by two different networks have competing sets of over ground pipes running side by side. The *Chnatrapati Shivaji Mavrata Ustaw Mandal* network (No.15 on the Map) reflects just such a competitive situation and given that it is the most recent type of network to emerge, it probably heralds the appearance of competing networks in the same space.

This overview of how the various systems were created demonstrates how each of the 15 networks has resulted from its own specific set of circumstances. This heterogeneity reflects very different political, ideological and financial imperatives and culminates in just as wide a variety of day-to-day operational situations and performances.

## 3 Evaluation of systems: Both regulations and performances need to be improved

### *3.1 Intermittent services with widely differing performances (see Table 2).*

The technical configuration of the water service (turning on the pump) imposes considerable timing and quality constraints. The rules and amount of water allocated vary considerably between different systems. The quantity of litres per household per day (LHD) ranges from 125 LHD in the worst case, equivalent to 30 litres per person per day (LPD), to 432 LHD or a little over 100 LPD in the best example. The median quantity for the 15 groups is 250 LHD or 60 LPD, whereas the BMC's stated aim is to supply at least 90 LPD, thus illustrating the area's prevailing "hydric stress". Each group sets its own distribution frequency which may be either once or several times a day, in the morning, afternoon or evening. Smaller networks (of less than 150 households) find it much easier than larger networks to adapt water distribution times to member needs.

The number of households drawing water from the same tap tends to increase with group size and too many users per tap can have harmful consequences. First, it increases electricity consumption as the pump has to keep running longer to supply all of the users for a given tap; and secondly, it increases tensions between users which may boil over in the event of power cuts or if the pump cuts out. In the case of three user group networks, fears over water scarcity caused by increasingly frequent power cuts led to the installation of

individual taps for each household. This helped head off possible conflicts by individualising water storage and it meant that each user was equally affected by power cuts.

Although the intermittent service is a drag for individual families, it does give user groups a certain degree of control over their water and electricity bills. Unlike a simple user group that only pays for the amount of water actually consumed, the members of this type of network must also bear the additional operating costs related to the size and upkeep of their infrastructures. These variable costs comprise: 1) the water bill for the actual water consumed by the group plus any leakage back into the network; 2) the electricity bill which depends on how long the motorised pump is used for every day as well as how old and powerful it is; and 3) the bill for maintenance and upkeep, that is, the wages of the community technician in charge of the technical upkeep and operation of the system.

Cost recovery for group bills is based on a flat rate that includes an individual consumption and operation charge. Each member household pays a fixed monthly amount[26] regardless of variations in overall group consumption. This fixed monthly amount ranges from 50 to 100 rupees depending on the group. An additional levy is charged to those "renting" households who contributed little or nothing to the initial cost of acquiring and setting up the infrastructure, who pay between 130 and 200 rupees a month. The group treasurer keeps the books and in the event of non-payment of a member, each group has a system of fines, usually consisting of an additional 5 to 10 rupees per month overdue. The recovery rate is usually close to 100 per cent due partly to close ties and the geographical proximity of households. But it is also down to the efficiency of the network managers in organising and legitimising regular bill payments as well as a real ability to pay by the group members in spite of their extremely limited financial resources.

Once group bills have been settled, depending on the organisation, the flat rate may be used to finance other community-type activities such as "*Shramik Vikassi Vibhag Mandal*" which now offers a whole range of sports, artistic and religious activities thirteen years after it was first set up in 1994. And the little office that was originally created to track and record the payment of individual bills gradually added new activities and has now evolved into a small micro-credit agency.

26 But this fixed charge may rise over time in line with annual increases in the group bill, especially due to increases in electricity prices.

So this flat rate system appears to work quite well and to provide an effective alternative to simply splitting group invoices among all members. However, it is for reasons of accounting expediency that a fixed monthly amount is billed and this amount does not reflect the actual cost which varies in line with actual electricity and water consumption. "Actual cost" comprises the system's effective consumption and operating costs and is equal to the total amount of group invoices for each user group divided by the total number of members. For the fifteen networks taken as a whole, the average actual cost comes out at 8.5 rupees per 1,000 litres, or nearly two and a half times the cost billed by the municipality[27]. This cost reflects the point of economic equilibrium[28] that the flat rate or the "cost billed" to the user has to cover. "Cost billed" corresponds to the flat rate charged in relation to quantity allocated and varies considerably between different user groups. It comes out on average at 10.3 rupees per 1,000 litres, or three times what the municipality initially charges users in the slums. In theory, actual cost should tie back to cost billed and the greater the disparity between the two, the farther away the group is from an optimal break-even situation. But this ideal is not necessarily the norm and some groups may find it advantageous to generate a monthly surplus. The variance between actual cost and cost billed to the user corresponds to a residual surplus or deficit once the user group has paid all its invoices. Large surpluses may be due either to a large positive difference between the flat rate charged and the individualised monthly cost of the service, or simply to the large number of group members who multiply this difference proportionally. The surplus generated may be set aside as a reserve to cover the cost of repairing the network or an increase in consumption in a given quarter or else to fund network improvements or even other community-type activities. And surpluses may vary greatly from one quarter to the next in line with consumption patterns. Groups that are running a deficit may correct this by simply cutting down the quantities of water allocated (as happened in the *Tanaji Vadi Seva Mandal* group in fourth-quarter 2007) or by increasing the flat rate charged to users. Three groups that had been providing their members with quite large quantities of water (over 300 LHD) raised their flat rate charge on 1 July 2007[29] in order to cover their costs. Financial equilibrium appears easier to control in smaller groups of less than 200 members.

27 Since 1 July 2002, the municipality has been billing an additional 60 per cent for sanitation charges at the basic rate of 2.25 rupees/1,000 litres that it charges to the slums. *Consequently, 1,000 litres of water would be billed in the slums at 3.6 rupees [2.25rupees + (2.25 x 60%)].*

28 Which can also legitimately be referred to as the break-even point in more commercial systems.

29 In India, July comes just after the summer holidays, marking the start of the school year.

The day-to-day running of these systems bears out the significant differences in the services provided using approaches specific to each group. Some provide a fairly good service, others a rather poor one and it is only reasonable to try to analyse the factors driving such differences. What are the variables that enable certain groups to provide a better service?

### *3.2 Comparative system evaluation framework and isolation of distinct variables*

The research sample area comprised 15 water distribution systems each of which, in spite of similar constraints (common geographical area, low incomes of the population served, same system based around a motorised pump), offer varying levels of service dictated by their own specific circumstances. It is therefore worthwhile isolating a number of criteria to evaluate the performance of each of these services such as *quantity, cost, appropriateness, and system sustainability (financial management)*. Each system was rated 1 to 5 on each criterion and the overall rating process resulted in a mark out of 20 and a league table. The evaluation and resulting league table for the different services enable us to highlight a number of variables (that tend to boost or hamper efficiency) and to make recommendations.

1) PRICE (cost billed[30] for 1,000 litres of water) is the primary indicator of the cost borne by the user in return for the service. This rating[31] ranges from 0 if the price is greater than 14 rupees per 1,000 litres, to 5 when it costs less than 6 rupees per 1,000 litres.

2) QUANTITY (the actual daily quantity allocated) is a key component in the evaluation. A fairly cheap service that only allocates a small amount of water is not deemed to be as good by certain users who prefer to pay a little more in order to receive a greater quantity. This rating[32] ranges from 0 when the quantity is less than 150 litres per day, to 5 when it exceeds 350 litres.

30 The price of the service includes not only the water bill - which determines the quantity allocated - but the electricity bill and the cost of paying the technician.

31 This rating is based around the pricing structure operated by MCGM. The cross-subsidisation system applied in Mumbai means that non-domestic consumers pay 50 per cent of water charges even though they only consume 8 per cent of the water. This allows the municipality to apply a “social water rate” for the slums which only pay 3.6 rupees per 1,000 litres. So, the average cost for 1,000 litres billed comes out at 10 rupees per 1,000 litres and we based our rating around this average.

32 This rating is based on the UN-Habitat criterion whereby a household needs at least 150 litres of water a day (UN-Habitat, 2003)

3) APPROPRIATENESS OF SERVICE (the fit between the service and user expectations) is evaluated using two sub-criteria: water distribution times (A) and number of households per tap (B). "Appropriateness of service" is obtained by weighing these two sub-components (x1⁄2) and then adding them together (A+B). The rating for sub-criterion A (water distribution times) ranges from –1 when the times are extremely inconvenient (irregular or at night), to +5 when they are adapted to the population's needs (twice a day, once in the morning and once in the evening)[33]. The rating for sub-criterion B (number of households per tap) ranges from 0 when over ten families share the same tap, to 5 when each household has its own tap. [34]

4) FINANCIAL MANAGEMENT (the extent to which the individual flat-rate charge covers the cost of the service, thus ensuring its long-term future) is evaluated using two sub-criteria: the accounting balance (C) and the difference between the monthly cost billed to the user and the actual individualised monthly operating cost (D). The rating for sub-criterion C[35] (accounting balance) must reflect the group's specific circumstances. Most of the water distribution systems do not have a market-based approach (only two are clearly run for profit) and their core objective is to serve the population. So, the evaluation of accounting profit or loss is based on the managers' ability to offer users as cheap a service as possible without jeopardising the system's financial equilibrium. Unlike a capitalist economic

33 The most frequent complaint concerns distribution times that force a member of a household to wait for the distribution to begin in order to store water.
When all group users are supplied during the evening: +3 points.
When some users are supplied at night: -1 point.
When distribution times are regular: +1point. When they are irregular: -1point.
When they "alternate" (they alternate daily but in a pre-defined manner): +1point.
When water is only distributed once every two days: -1point;
When water is distributed daily: +0 point;
When it is distributed twice a day: +1 point.

34 A lot of users would like to have their own individual taps and an offer to this effect which was launched by the private entrepreneur Appa Balgue (Shriram Sanjeevan Pani Prakalpt group) in 2003 was copied by a number of other systems, thus highlighting the increasing demand for individualised service.

35 **Negative balance**: income is insufficient to cover total costs. Insofar as it jeopardises the long-term future of the system, any network with a negative balance will be rated negatively: -1 point.
**Balanced books**: income is equal to expenditure. We consider the books to be in balance when the surplus/deficit does not exceed 1,000 rupees per month.
The network has near-optimal financial management, however, it could still have to contend with exceptional financing requirements for repairs or improvements: +2 points.
**A small surplus** of between 1,000 and 5,000 rupees per month. This surplus provides a bulwark against future unpaid bills or network repairs: +3points.
**Large surplus** with redistribution: any surplus greater than 5,000 rupees can be used to finance other community-type activities, to revamp other public services or for network repairs and improvements. Although the network's primary purpose is water distribution, the financial surplus may also be used for the benefit of the group as a whole so large surpluses are assigned a rating of +1point.
**Large surplus without any redistribution**: the surplus does not benefit the group as a whole: 0 point.

approach, our study does not treat a large surplus as necessarily indicating "good management", but rather a lack of distribution. Nevertheless, a small surplus may be vital for ensuring the long-term future of the network and providing a reserve to pay for any maintenance or repair charges. And while balanced books have the advantage of indicating a redistributive approach, they may leave the system exposed to the risk of unpaid bills in the event of major repairs or upkeep charges. The rating for sub-criterion D (difference between the actual monthly operating cost and the monthly cost billed to the user) is contingent on the surplus that certain groups generate, sometimes due simply to their large number of members. It is therefore important not to penalise large groups and to compensate them for points they may have lost due to their large surplus by rating the variance between the monthly cost billed to users and the actual individualised monthly costs.[36]

The QUALITY criterion was not used because none of the households interviewed complained about poor quality water or any water-related illnesses.

### *3.3 League table*[37] *and identification of an ideal-type user group network*

(See the summary table and Diagram No.3 – water system league table based on a 20 point evaluation – Appendix)

As we can see from the summary table and diagram No.3, the first nine groups are small in size comprising less than 200 households and characterised by strong community ties between members. Conversely, the lowest ratings were obtained by the largest networks: *Sarna Gay Seera Trust* (500 households) only got 1 point, *Utkarsh Rahivasi Mandal* (650 households) 2.5 points and *Tanaji Vadi Seva Mandal* a mere 3.5 points.

36 **Equivalence between costs**: There is only a very small difference - less than 10 rupees per month per user - between the flat rate charged to users and the actual operating cost. This means that users are paying the correct rate: +2 points.
**Small difference:** There is a relatively small difference - between 10 and 19 rupees per month per user - between the flat rate charged to users and the actual operating cost. Users pay a relatively high, but still reasonable rate: +1 point.
**Big difference:** There is a significant difference - between 20 and 30 rupees per month per user - between the flat rate charged to users and the actual operating cost. The service is expensive: 0 point.
**Very big difference**: There is a very big difference - over 30 rupees per month per user - between the flat rate charged to users and the actual operating cost. The service is too expensive: -1 point.

37 We need to put this *factual* classification into perspective insofar as the data describes management at a given point in time: some groups may have suffered from a recent increase in their flat rate and would have scored much better if they had been surveyed just before; conversely, groups that had not yet put up their flat rate when the survey was conducted got a much better score.

A group's rating and a comparison with the number of households in the group point to a strong correlation between group size and service provided: *service performance tends to deteriorate as the number of users increases.*

Involving communities in planning, acquiring and running the water distribution network would appear the best way of delivering an affordable service that meets user expectations. The top three systems – *Krishna Seva Mandal, Sri Prasad Rahivasi Vikas Mandal* and *Nav Yug Rahivasi Vasi Mandal* – are perfect examples. Two of these were completely (or almost completely) self-financed. Their small size as well as user ownership of infrastructures appears to enhance service performance.

Therefore, the major findings of this evaluation are that *smaller-sized user group networks perform best, however they are heavily penalised by higher per-litre water charges.*[38]

So we can use the evaluation to develop an ideal-type user group: a *small-sized group* with about a hundred households and strong bonds of trust between members; *considerable community involvement in financing* the infrastructure as this helps create a stakeholder dynamic; *costs billed to users that correspond to actual operating costs* while generating a small surplus that may be used to improve the system over the medium term.

### *3.4 What is the most effective institutional framework for these user group networks?*

As user group networks have obtained *de facto* long-term recognition, it would appear necessary to clarify municipal/community relations in order to optimise their *modus operandi* for the benefit of users. The key is to achieve the best possible between between the positive aspects of these systems and more effective integration at municipal level.

Although the following recommendations were devised for a specific case, that is, Ram Nagar, they may also be applied to other neglected districts faced with similar geographical and social constraints.

- First and foremost, these systems must have preferential water and electricity rates and any such cross-subsidisation scheme is contingent on institutional recognition of their

38 On account of group electricity and upkeep/repair invoices that must be added to water charges.

specific features.39 However, we do not recommend that managers contractualise existing arrangements in the neighbourhood. We consider that this could be counter-productive and have an adverse impact on access to the service by upsetting informal arrangements already in place.[40]

- As regards the allocation of group connections by the municipality, simply formalising existing procedures is the best solution at present. We should highlight two points here. First, making administrative exceptions for unauthorised populations would avoid a process of "cumulative exclusion"[41] of the most distressed populations. Second, recommending smaller groups – without making this an official obligation so as not to hamper private entrepreneurs – would encourage the development of practices and standards that are more in line with user expectations.

- From a technical perspective, building overhead tanks would appear an ideal solution for dealing with the problem of intermittent service although this in turn raises new questions. Would such tanks allow the energy consumed by the pumps to be managed in an optimal manner? Would the resulting necessity of installing water meters be beneficial for each household? And would the investment needed to build the overhead tanks be economically viable? Getting answers to this complex series of questions requires much more detailed technical, social and economic analyses.

- And, last but not least, municipal action in the area requires two-way dialogue with community representatives that will make it possible for new policies to be taken up by those most concerned.

What is really key here is the need to preserve user group autonomy and combine this with preferential rates provided by the municipality in order to spatially regulate areas

39 While electricity subsidies are not really possible in an Indian context, it should be possible to lower water charges per 1,000 litres for connections in this neighbourhood to offset the cost of running the mechanised pump. We suggest subsidising water charges to bring down the rates charged in the slums by a third, that is, 2.4 rupees per 1,000 litres (1.5 rupees +60% for sanitation) instead of the 3.6 rupees (2.25 rupees +60% for sanitation) currently charged. This would make it possible to supply 500 extra litres for the same price, or 1,500 litres for 3.6 rupees. So, for the same amount charged, this would increase the median quantity delivered from 250 LHD to 333 LHD, or by an average of 83 LPD (which is close to the minimum quantity that the BMC is supposed to supply to users).

40 Especially given the bureaucratic and technocratic approach of the municipality and the local community's distrust of it.

41 No legally authorised status → no official documents → no access to the service → access to a more expensive and less efficient service.

like this one and provide them with a public service that is differentiated in terms of its offering but integrated into the water distribution system as a whole.

## Conclusion

A virtually non-existent municipal offering coupled with a weak institutional environment and a highly specific geographical context has led users in the slum of Ram Nagar to take water distribution into their own hands. Although they are far from perfect, "user group networks" represent a definite step forward for the inhabitants and they are proof of their ability to become involved in a management process adapted to local circumstances.

Can these user group networks really provide a long-term alternative to the conventional public water supply system?

Faced with the difficulties of deploying a centralised, efficient and universal system, the municipality obviously has much to gain from continuing to pass its responsibilities *vis-à-vis* this area - which now has official legal authorisation – onto the slum dwellers themselves. However the shoddy overall level of service and the widely differing performances of the different user groups fly in the face of any notion of equity as theoretically defined in a public service charter. They also set off political-financial struggles that divide the area into a number of territories.

So, while these alternative arrangements have provided temporary solutions to water access in Ram Nagar, their long-term survival is contingent on securing preferential rates and cross-subsidies from the municipal system. This would involve setting up cross-subsidies for both water and electricity rates while continuing to give free rein to innovation and facilitate a gradual improvement in access to the service. Closer ties between the municipality and the communities, therefore, appear to be a *sine qua non* for the long-term sustainability of user group networks.

More generally, serious consideration needs to be given to providing institutional recognition for certain stop-gap solutions deployed in the slums because once they are officially authorised, they can provide a valuable option for developing the public service.

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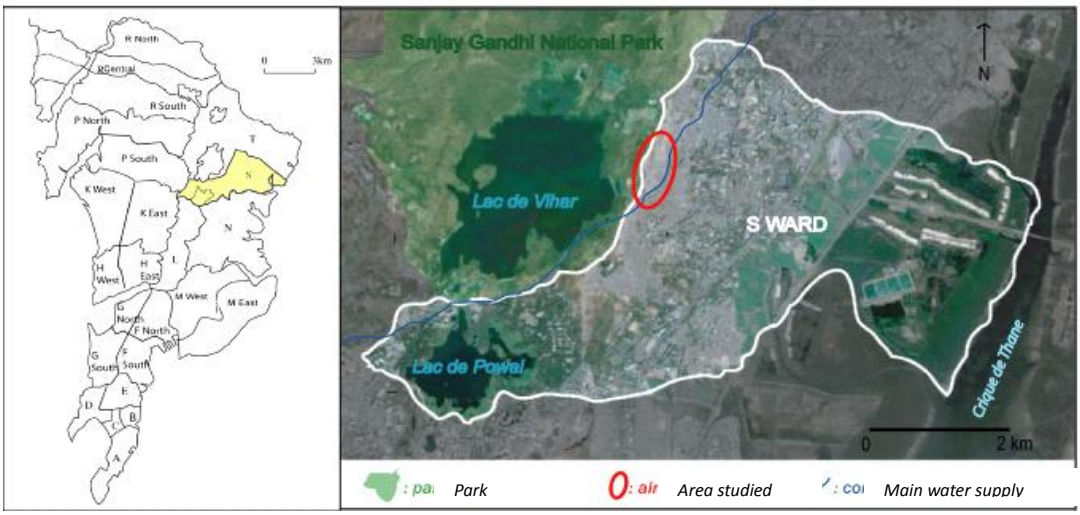
# Appendices

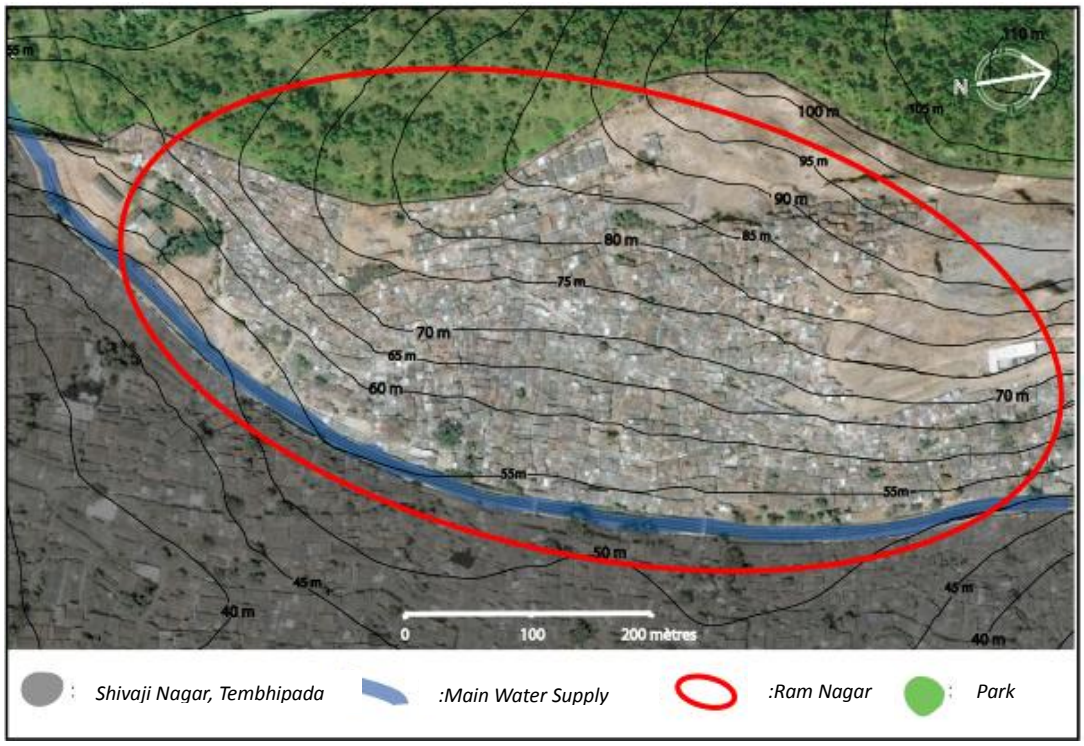
## MAPS

### Map n°1 and n°2: location of the research area



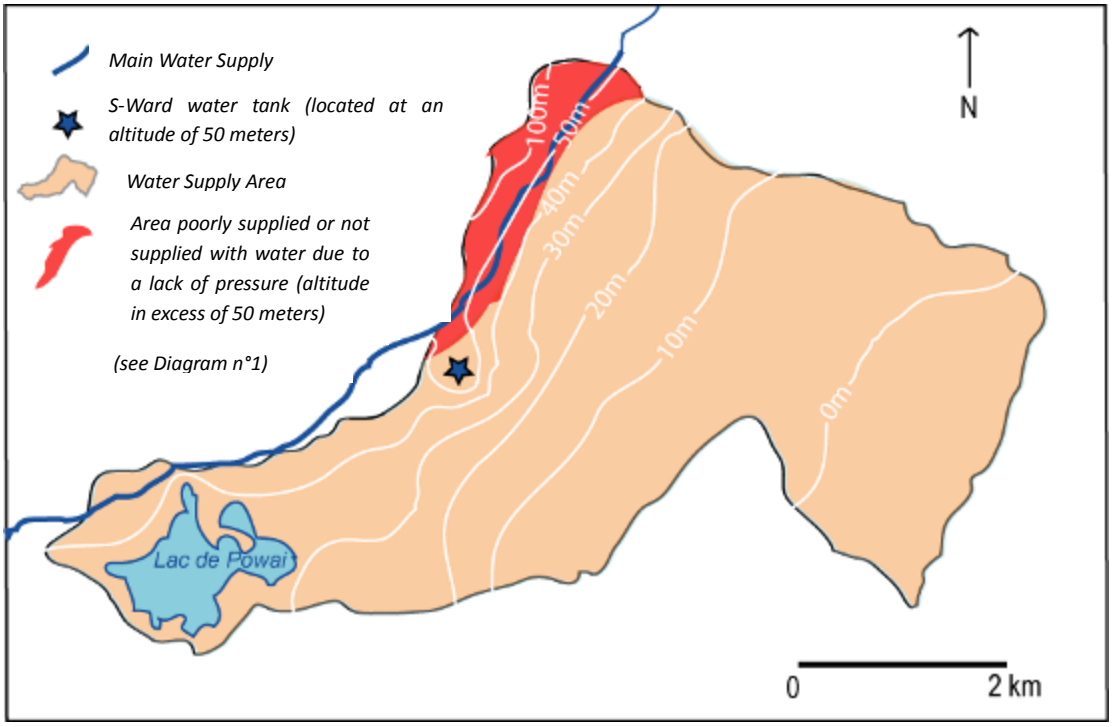

Source: google earth

### Map n°3: Urbanisation of the site



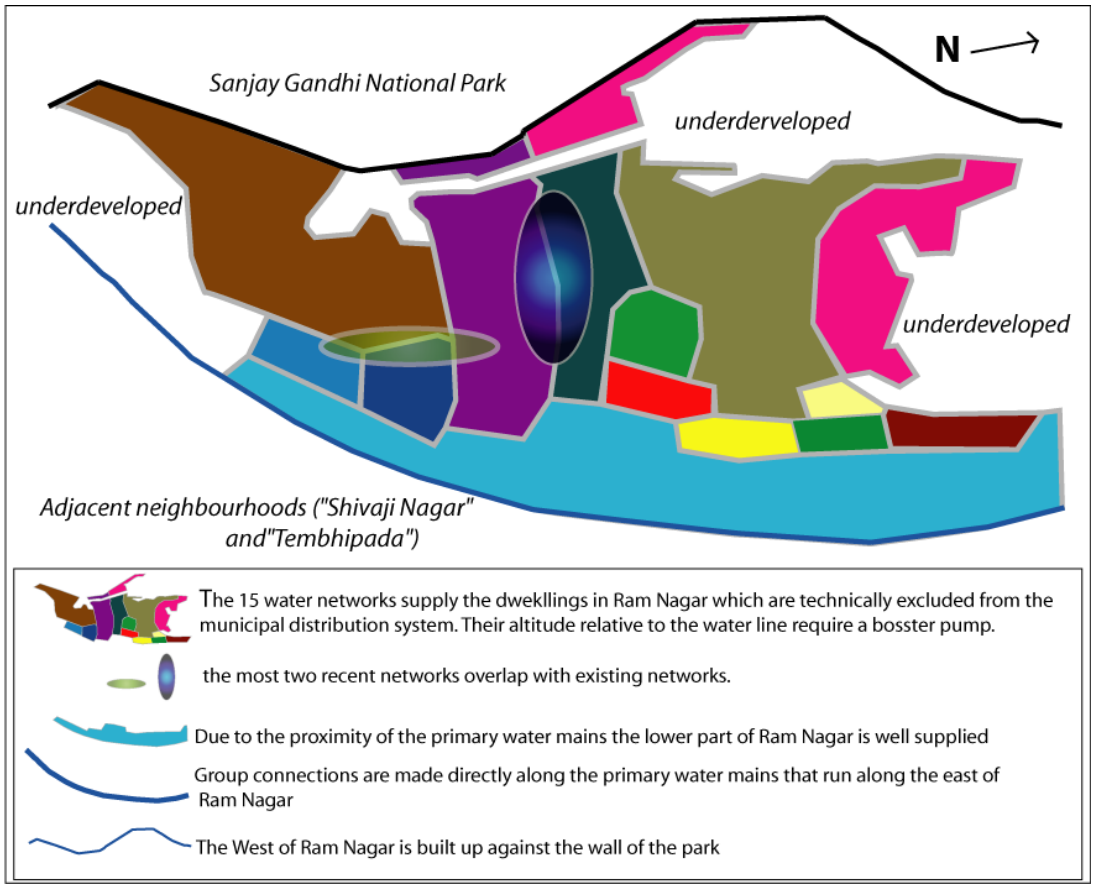

Source: Google Earth

## Map n°4: S-ward water supply



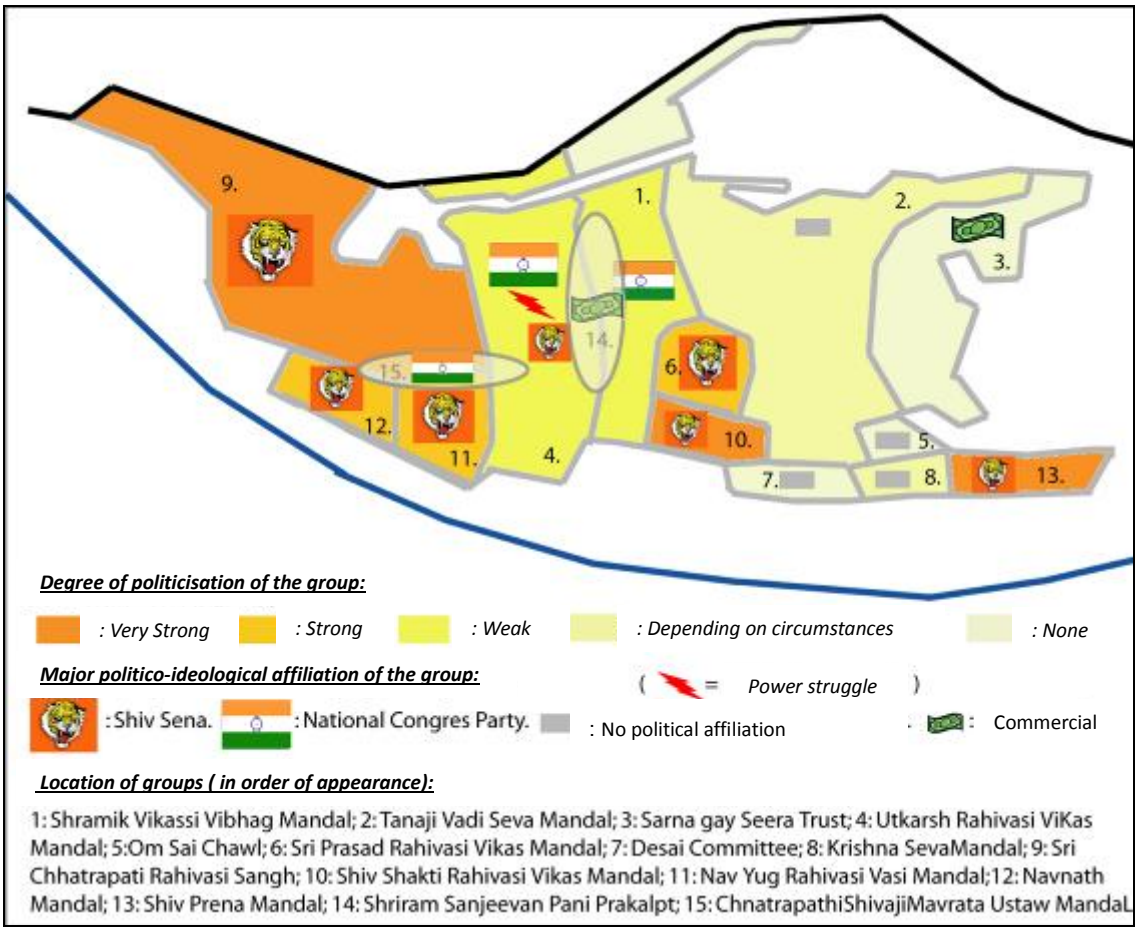

Source: Based on the authors' research

## Map n°5: Mapping of the 15 user group networks




Source: Based on the authors' research

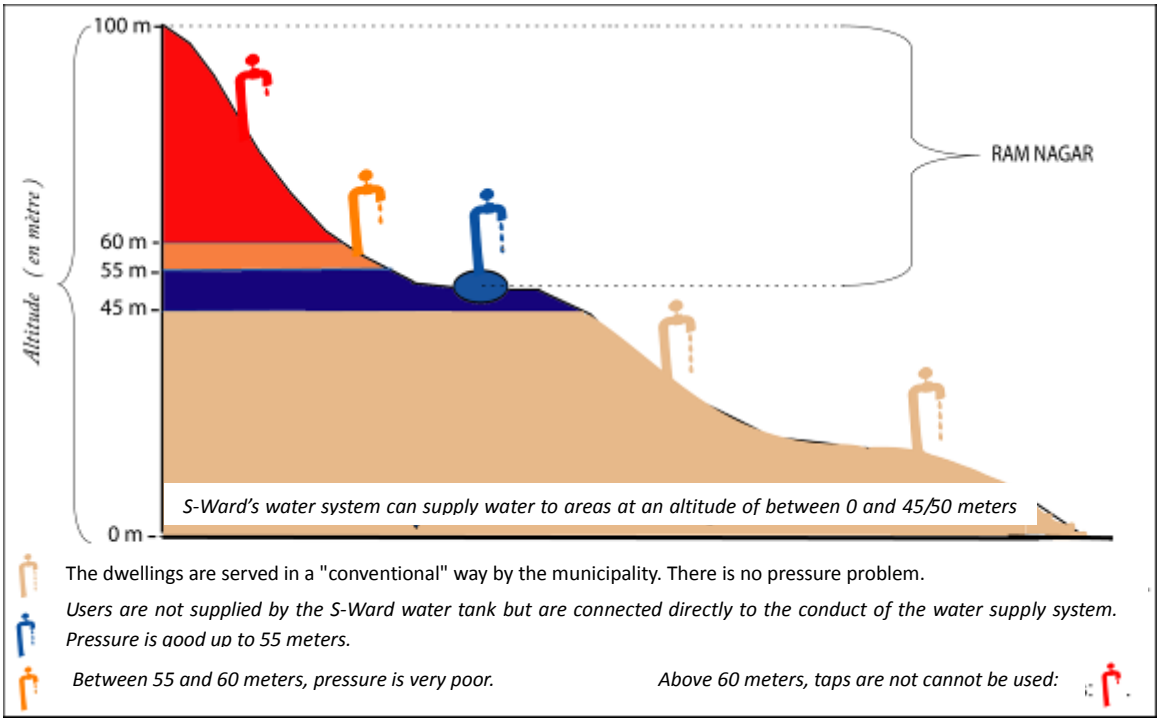
## Map n°6: Political geography of Ram Nagar based around the user group networks




Source: Based on the authors' research

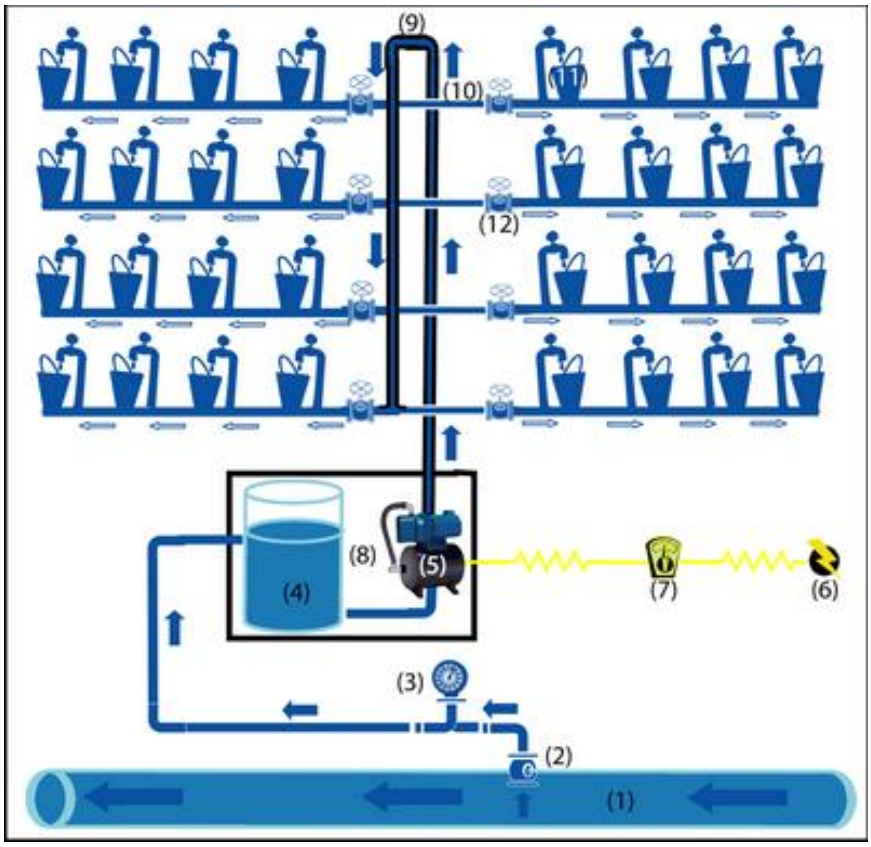
## DIAGRAMS

### Diagram n°1: pressure and altitude




Source: Based on the authors' research

## Diagram n°2: Technical operation of the user group network




Source: Based on the authors' research

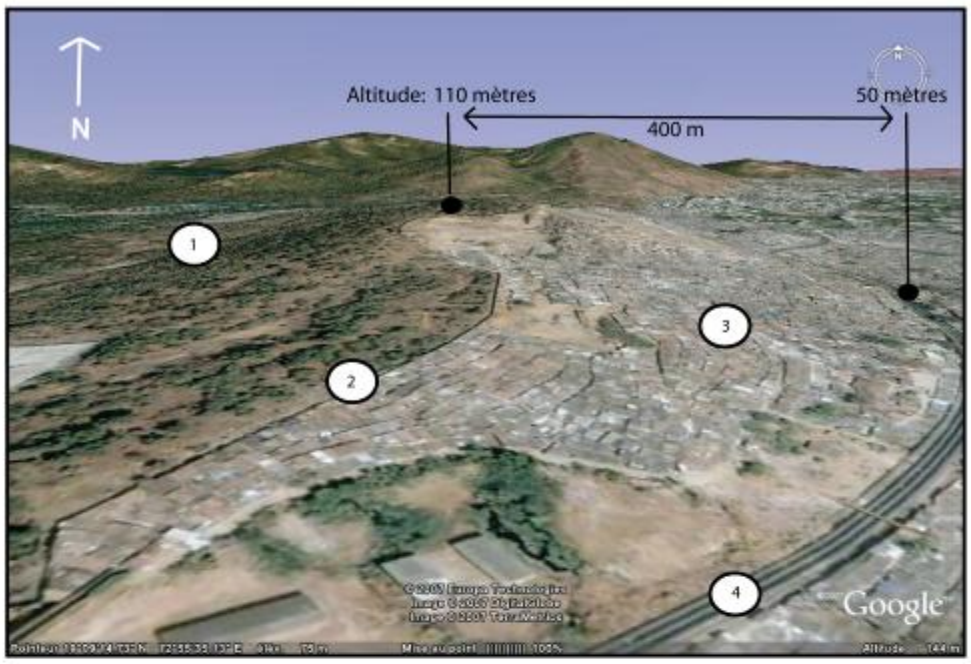
The infrastructure of a "user group network" includes:

- **A connection (2)** by the BMC directly to the **primary water mains (1)** Its size, identical for each mini network, measures 6 inches (or 2.541 cm).
- **One water meter (3)** fixed onto that connection for measuring water consumption.
- **One tank (4)** placed in close proximity to the connection. Its capacity is variable and usually depends on the initial funding attended by more than the number of people to serve. Thus, its capacity can vary from 5,000 litres for the smallest (self-funded) networks to 100,000 litres for the largest (with funds from outside the community).
- **A motorised electric pump (5):** its power varies from 5 to 15 HP74 HP. It is plugged directly into the tank and pumps the water in the mini grid.
- **An electrical connection (6):** the connection is significant and supports three-phase power flow.
- **One electricity meter (7)** charges the power consumption required to operate the pump.
- **A solid structure (8):** to house the tank and the pump. This also requires purchasing or leasing land.
- **Main water pipes (9):** their size varies between 5 cm and 7 cm depending on the project. Their length can vary from 40 meters for the smallest system to 400 meters for the largest. It is not buried to reduce costs.
- **A system of unburied secondary pipes (10)** connects the main line to a set of collective and sometimes individual **"street taps"**[42] **(11)** (for three of the five networks).
- **A system of valves (12):** supply the various divisions of the entire mini-system when water is distributed.

42 'Gali tap' (Tovey 2002).

## ILLUSTRATION

## Photographic material: summary of Ram Nagar's specific geographical features




**1:** Sanjay Gandhi National Park: nature reserve of 104km2, founded in 1969.

**2:** A long wall encircles the park to prevent new populations moving in. It delineates a boundary between urban space and natural space. It peaks at 110 meters on the crest of the mountain.

**3:** The urbanisation of the area occurred from the "bottom up", until it reached the wall of the Park. The area studied, "Ram Nagar", stretches from the eastern side, between 50 and 110 meters high and comprises a total area of approximately 1000 m2.

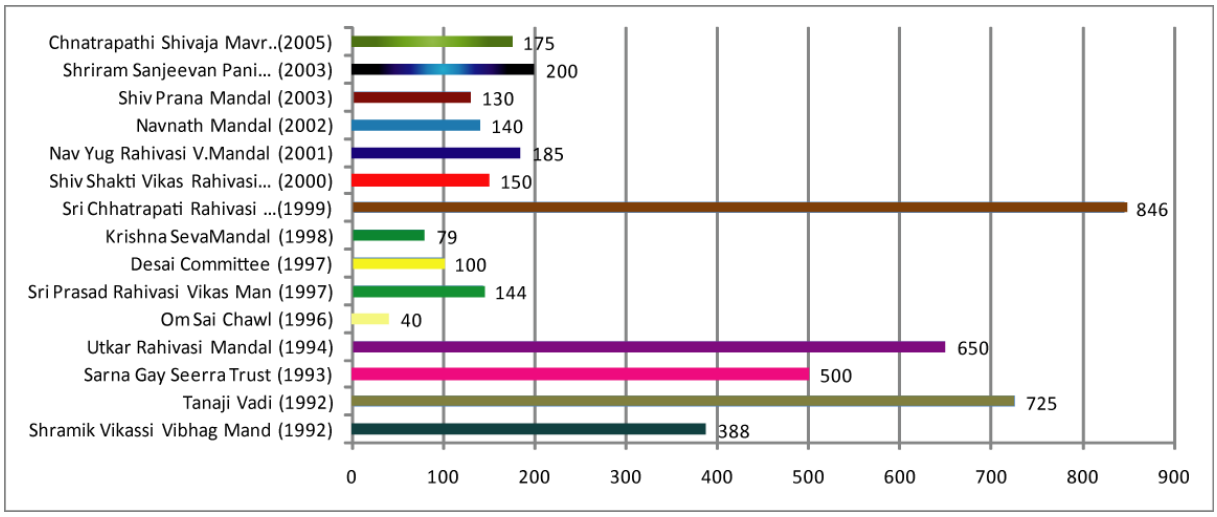




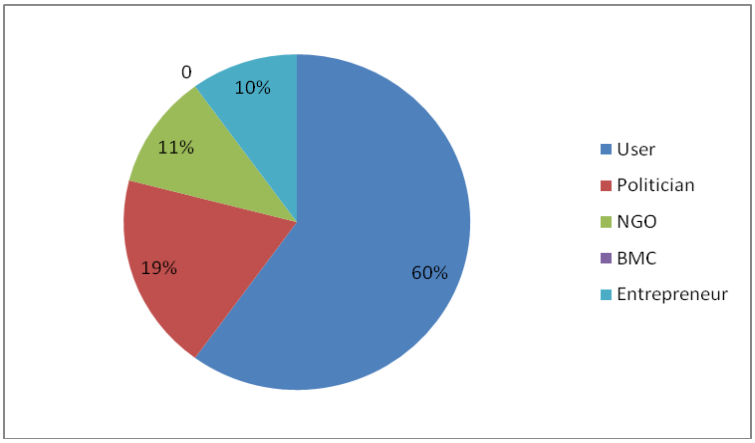
**Source: Based on the authors' research**

## GRAPHS

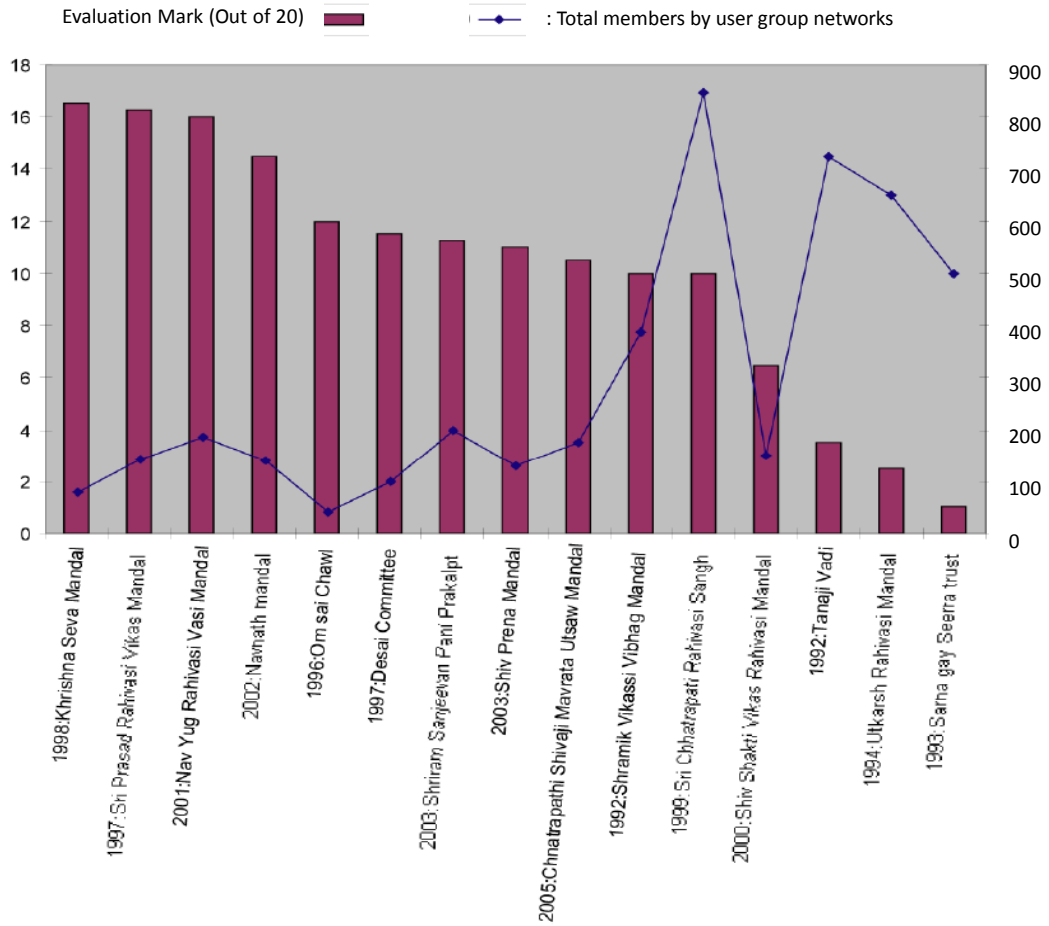
### Graph n°1: number of households supplied via the 15 networks in 2007 (classified in chronological order of creation)




### Graph n°2: Share of each actor in the total funding of the 15 networks



**Graph n°3: Classification of the 15 systems evaluated (out of a possible total of 20 points)**



## TABLES
## User group networks (by name and date of creation)

| |
|---|
| 1992:Shramik Vikassi Vibhag Mandal |
| 1992:Tanaji Vadi |
| 1993:Sarna gay Seerra trust |
| 1994:Utkarsh Rahivasi Mandal |
| 1996:Om sai Chawl |
| 1997:Sri Prasad Rahivasi Vikas Mandal |
| 1997:Desai Committee |
| 1998:Khrishna Seva Mandal |
| 1999:Sri Chhatrapati Rahivasi Sangh |
| 2000:Shiv Shakti Vikas Rahivasi Mandal |
| 2001:Nav Yug Rahivasi Vasi Mandal |
| 2002:Navnath mandal |
| 2003:Shiv Prena Mandal |
| 2003:Shriram Sanjeevan Pani Prakalpt |
| 2005:Chnatrapathi Shivaji Mavrata Utsaw Mandal |

## Table n°1: Who finances?

| **Number of households 2007** | **Household contribution (in Rs.)** | **Total cost reported (in Rs.)** | **Total contributions *collected* (in Rs.)** | ***through households*** | ***through politicians*** | ***through NGOs*** | ***through BMC*** | ***through entrepreneurs*** |
|---|---|---|---|---|---|---|---|---|
| 388 | 2250 | 1500000 | 2273000 | *873000* | *700000* | *700000* | *0* | *0* |
| 725 | 600 | 1500000 | 2135000 | *435000* | *1000000* | *700000* | *0* | *0* |
| 500 | 3251 | 1000000 | 2675500 | *1625500* | *0* | *0* | *0* | *1050000* |
| 650 | 1200 | 1200000 | 1572000 | *780000* | *42000* | *750000* | *0* | *0* |
| 40 | 6000 | 200000 | 240000 | *240000* | *0* | *0* | *0* | *0* |
| 144 | 7000 | 250000 | 1038000 | *1008000* | *30000* | *0* | *0* | *0* |
| 100 | 3500 | 240000 | 450000 | *350000* | *100000* | | | *0* |
| 79 | 5200 | 400000 | 410800 | *410800* | *0* | *0* | *0* | *0* |
| 846 | 1000 | 1500000 | 1546000 | *846000* | *700000* | *0* | *0* | *0* |
| 150 | 2000 | 400000 | 400000 | *300000* | *100000* | *0* | *0* | *0* |
| 185 | 2000 | 300000 | 520000 | *370000* | *150000* | | | *0* |
| 140 | 1500 | 300000 | 310000 | *210000* | *100000* | *0* | *0* | *0* |
| 130 | 2000 | 200000 | 290000 | *260000* | *30000* | *0* | *0* | *0* |
| 200 | 3500 | 500000 | 924000 | *700000* | *0* | *0* | *0* | *224000* |
| 175 | 500 | 400000 | 487500 | *87500* | *400000* | *0* | *0* | *0* |

## Table n°2: What service at what price?

| Number of households<br><br>In 2007 | Number of litres supplied per household per day | Number of households on 1 tap | Monthly fee charged[43]<br><br>(in Rs.) | Cost charged for 1000 litres<br><br>(in Rs.) | Real cost for 1000 litres<br><br>(in Rs.) |
|---|---|---|---|---|---|
| 388 | 323 | 1 | 100 | 10,7 | 5,53 |
| 725 | 230 | 8 | 75 | 10,5 | 7,57 |
| 500 | 125 | 5 | 80 | 20,64 | 14,4 |
| 650 | 206 | 12 | 65 | 11,7 | 5,4 |
| 40 | 224 | 5 | 70 | 10 | 10,4 |
| 144 | 311 | 1 | 70 | 7,2 | 6,8 |
| 100 | 164,2 | 2 | 60 | 11,8 | 8,8 |
| 79 | 340 | 3 | 70 | 6,6 | 6,6 |
| 846 | 263 | 10 | 50 | 7,7 | 6,7 |
| 150 | 179 | 6 | 75 | 13,5 | 12,6 |
| 185 | 432 | 3 | 100 | 7,4 | 7,7 |
| 140 | 320 | 3 | 100 | 10 | 7,13 |
| 130 | 184 | 2 | 60 | 10,5 | 9,4 |
| 200 | 150 | 1 | 50 | 10,8 | 10,6 |
| 175 | 307 | 5 | 50 | 5,25 | 7,5 |

43 These fees are between 130 rupees and 200 rupees for "tenants", including Adivasis, who have not participated in the financing.

**Table n°3: SUMMARY**

| Name of the "user group network" (in chronological order of creation) | **Number of households** | ***appropriateness of the service* criterion (on 5 pts)** | ***financial management* criterion (on 5 pts)** | ***quantity* criterion (on 5pts)** | ***price* criterion (on 5pts)** | **TOTAL (on 20 points)** |
|---|---|---|---|---|---|---|
| *1992:Shramik Vikassi Vibhag Mandal (1)* | *388* | **3** | **1** | **4** | **2** | **10** |
| *1992:Tanaji Vadi (2)* | *725* | **-0,5** | **0** | **2** | **2** | **3,5** |
| *1993:Sarna gay Seerra trust (3)* | *500* | **2** | **-1** | **0** | **0** | **1** |
| *1994:Utkarsh Rahivasi Mandal (4)* | *650* | **-0,5** | **0** | **2** | **1** | **2,5** |
| *1996:Om sai Chawl (5)* | *40* | **4** | **3** | **2** | **3** | **12** |
| *1997:Sri Prasad Rahivasi Vikas Mandal (6)* | *144* | **4,25** | **4** | **4** | **4** | **16,25** |
| *1997:Desai Committee (7)* | *100* | **4,5** | **5** | **1** | **1** | **11,5** |
| *1998:Khrishna Seva Mandal (8)* | *79* | **4,5** | **4** | **4** | **4** | **16,5** |
| *1999:Sri Chhatrapati Rahivasi Sangh (9)* | *846* | **1** | **2** | **3** | **4** | **10** |
| *2000:Shiv Shakti Vikas Rahivasi Mandal (10)* | *150* | **0,5** | **4** | **1** | **1** | **6,5** |
| *2001:Nav Yug Rahivasi Vasi Mandal (11)* | *185* | **3** | **4** | **5** | **4** | **16** |
| *2002:Navnath mandal (12)* | *140* | **4,5** | **3** | **4** | **3** | **14,5** |
| *2003:Shiv Prena Mandal (13)* | *130* | **4** | **4** | **1** | **2** | **11** |
| *2003:Shriram Sanjeevan Pani Prakalpt (14)* | *200* | **4,25** | **4** | **1** | **2** | **11,25** |
| *2005:Chnatrapathi Shivaji Mavrata Utsaw Mandal (15)* | *175* | **2,5** | **-1** | **4** | **5** | **10,5** |

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